

**10/549281**

**JC17 Rec'd PCT/PTO 13 SEP 2005**

**Siemens AG  
New PCT Application  
Case No. P05,0307 (26965-3478)  
Client Ref. No. 2003P01089 WOUS**

**5 Inventor: Hofmann et al.**

**10 Translation / 13 September 2005 / Bullock / 1110 words**

**ULTRASONIC SHOCK WAVE HEAD FOR USE IN LITHOTRIPSY**

The invention relates to an ultrasonic shockwave head for lithotripsy.

- 5 An ultrasonic shockwave head for lithotripsy (as it is, for example, known from WO 95/24159 or DE 37 39 390 A1) comprises a plurality of individual components that are arranged in a housing. The individual components, in particular the lens used for focusing of the ultrasonic shockwaves and the actual shockwave source (i.e. the transducer generating the ultrasound), must be spatially positioned exactly relative to one another in a housing of the ultrasonic shockwave head in order to ensure a reproducible position of the focus. This is connected with a significant production-related effort.
- 10

- 15 The invention is now based on the object to specify a ultrasonic shockwave head for lithotripsy that is simple to produce and in which a high reproducibility of the position of the focus is ensured.

- 20 The cited object is achieved according to the invention with an ultrasonic shockwave head with the features of the patent claim 1. Since a bearing housing for the shockwave source is integrally molded as one piece on the acoustic lens, a high reproducibility of the reciprocal bearing of acoustic lens and show is ensured with a simultaneously simpler, cost-saving manufacture. Lens and bearing housing for the shockwave source thus form an integral component that can be produced in a single work operation, for example via an injection molding-related method.

25

Further advantageous embodiments of the invention result according to the sub-claims.

- 30 For further explanation of the invention, reference is made to the exemplary embodiment of the drawing, in whose single Figure a device according to the invention is schematically illustrated.

According to the invention, an inventive ultrasonic shockwave head comprises an annular shockwave source 2 with planar radiation surface 4. An acoustic lens 6 is arranged at a distance from this radiation surface 4, which acoustic lens 6 is  
5 biconvex in the exemplary embodiment and which focuses the ultrasonic shockwaves emitted by the shockwave source 2 in a focus (not shown in the Figure).

A bearing housing 8 for accommodation of the shockwave source 2 is integrally  
10 molded as one piece on the acoustic lens 6. This bearing housing 8 comprises an inner, approximately hollow-cylindrical wall part 10 that is concentrically surrounded by an outer wall part 12 (likewise integrally-molded on the lens 6). The hollow space 14 surrounded by the inner wall part 10 extends up to the acoustic lens 6 and empties into the coupling space 16 bounded by this, which  
15 coupling space 16 is filled with a coupling fluid (normally water) in operation of the device. The hollow space 14 serves for acquisition of an image-generating ultrasonic transducer arrangement that generates an A-image or a B-image and serves for monitoring of the correct positioning of the focus in the body of a patient.  
20  
Annularly circumferential shoulders or sections 18 or, respectively, 20 are integrally molded on the outer surface of the inner wall part 10 and the inner surface of the outer wall part 12, on which shoulders or segments 18 or, respectively, 20 the shockwave source 2 rest on the edge of its radiation surface 4,  
25 respectively over an interleaving sealing ring 22 or, respectively, 24. An approximately annular change 26 located between the shockwave source 2 and the acoustic lens 6 and filled with fluid in operation is sealed fluid-tight with the aid of this sealing ring 22, 24. In the exemplary embodiment, further density rings 28, 30 are optionally provided at the density rings 22, 24 in order to seal the chamber 26.

The inner wall part 10 is provided with an external threading 32 on its outer circumference and the outer wall part is provided with an inner threading 34 into which are screwed pressure rings 36 or, respectively, 38 with which the shockwave source 2 is pressed against the sections 18, 20 and is fixed in this position.

5

The bearing housing 8 moreover comprises fluid-conducting channels 40, 42 that interconnect with the chamber 26 or, respectively, the coupling space 16 before the acoustic lens 6 and serve for filling the chamber 26 or, respectively, the coupling space 16 with the coupling fluid. The bearing housing 8 is moreover provided in

10 the region of the acoustic lens 6 on its outer circumference with an annular, circumferential recess 44 that serves for fluid-tight application of an elastic coupling membrane.

The acoustic lens 6 and the bearing housing 8 form a one-piece, integral component that is comprises of a polymer material and can be produced in an injection-molding method in a single work step. Since the bearing housing 8 formed in this manner for the shockwave source 2 simultaneously forms the acoustic lens 6 or, in the reversed approach, the acoustic lens 6 is simultaneously the bearing housing 8 for the shockwave source 2, it is ensured that, without

15 additional adjustment measures, lens 6 and shockwave source 2 are always positioned correctly both with regard to the separation and with regard to the axial alignment (center position and angle setting of the axis).

20